UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/630,777	08/02/2000	Tetsuro Kawahara	Q60204	8005

7590 10/06/2003

Sughrue Mion Zinn MacPeak & Seas PLLC
2100 Pennsylvania Avenue NW
Washington, DC 20037

EXAMINER	
FERGUSON, LAWRENCE D	
ART UNIT	PAPER NUMBER
1774	

DATE MAILED: 10/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/630,777	Applicant(s) KAWAHARA ET AL.	
	Examiner Lawrence D Ferguson	Art Unit 1774	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 July 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Response to Request for Reconsideration

1. This action is in response to the request for reconsideration mailed July 10, 2003. Claims 1-2 and 4-9 are pending.

Claim Rejections – 35 USC § 103(a)

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-2 and 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue, et al. EP 0 901 991 A2 in view of Murasawa et al (U.S. 5,547,823).

4. EP '991 discloses a photocatalytic glass pane high in photocatalytic activity with at least one layer formed on at least one major surface of the glass substrate and at least one layer has an outer layer made of photocatalytic titanium oxide (paragraph 0005 through 0007). EP '991 discloses at least one first interlayer and at least one second interlayer made of aluminum oxide, tin oxide or zinc oxide (paragraph 0015, lines 1-5). EP '991 discloses the titanium oxide layer directly formed on a glass substrate (paragraph 0018, line 17). EP '991 discloses the titanium oxide film with a thickness of 135nm (paragraph 0019, line 43) and the aluminum oxide film having a

thickness of about 70nm (paragraph 0026, line 55). EP '991 discloses a titanium oxide film formed on the aluminum oxide film (paragraph 0027, line 58). Although EP '991 does not explicitly disclose the films as n-type semiconductor films, it includes semiconductor materials comprising solid crystalline material having electrical conductivity greater than insulators but less than good conductors, such as titanium and aluminum. EP '991 does not disclose zirconium oxide or the band gap of the primer layer.

Murasawa teaches a first layer provided on a substrate and a second layer with photocatalytic activity layer on the first layer where the first layer comprises zirconium oxide (column 5, lines 4-18). Murasawa further teaches a photocatalytic composite having a band gap energy (column 6, lines 16-22). EP '991 and Murasawa are analogous art because they are from the field of photocatalytic articles. It would have been obvious to one of ordinary skill in the art to include the zirconium oxide in the primer layer of EP '991 because Murasawa teaches the primer layer comprising the zirconium oxide enables a firm connection between the substrate and the second layer containing the photocatalytic particles resulting in a firmer adhesion of the photocatalytic layer onto the substrate (column 5,lines 7-12). Neither reference explicitly discloses an energy band gap of the two layers. Even though Inoue is silent towards the amount of energy band gaps, the claimed band gaps are directly related to the specific semiconductor films used. Since the reference uses the same zirconium oxide and film as the photocatalyst and primer films, respectively, the energy band gap of these films would be expected to be the same as applicant's claims. Since the films are arranged in

the same manner as applicant claims to make an article having photocatalytic activity as applicant claims, any other features afforded would be expected to occur, absent a showing of unexpected results.

Claim Rejections – 35 USC § 103(a)

5. Claim 1-2 and 4-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doushita et al. (U.S. 6,576,344).

6. Doushita discloses a photocatalytic article comprising a photocatalyst film containing titanium oxide coated onto a substrate (column 4, lines 1-3) where an alkali-blocking film is provided on the glass substrate to prevent diffusion of alkali material from the glass substrate into the titanium oxide film (column 4,lines 18-31). Doushita discloses the alkali blocking film is comprised of zirconium oxide (column 4, lines 33-36) where the alkali blocking film has a thickness of 5nm or more (column 4,lines 59-60). The reference discloses the film has a thickness of 2 to 2000nm (column 3,lines 64-66). Doushita discloses an overcoat hydrolyzable coating formed over the photocatalytic film (column 10, lines 24-40). Even though Doushita is silent towards the amount of energy band gaps, the claimed band gaps are directly related to the specific semiconductor films used. Since the reference uses the same zirconium oxide and titanium oxide as the photocatalyst and primer films, respectively, the energy band gap of these films would be expected to be the same as applicant's claims, absent any showing of unexpected results.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yamamoto et al. (U.S. 6,582,839) teaches a substrate and photocatalytic film covering the substrate, where the film contains zirconium oxide (abstract). Additionally, Kimura et al. (U.S. 6,228,480) teaches a photocatalyst carrying structure comprising a photocatalyst layer and substrate (abstract).

Response to Arguments

8. Arguments made in regards to rejection under 35 USC 103(a) as being unpatentable over Inoue, et al. EP 0 901 991 A2 in view of Murasawa et al (U.S. 5,547,823) have been considered but are unpersuasive. Applicant argues EP '991 and Murasawa do not teach each and every element of the claimed invention because the combination does not tech a primer layer comprising an n-type semiconductor film. Examiner respectfully disagrees because EP '991 includes n-type semiconductor materials comprising solid crystalline material having electrical conductivity greater than insulators but less than good conductors, such as titanium and aluminum. Applicant further argues EP '991 does not comprise at least one metal oxide selected from the group consisting of niobium oxide and zirconium oxide. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of

references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Murasawa teaches a first layer provided on a substrate and a second layer with photocatalytic activity layer on the first layer where the first layer comprises zirconium oxide (column 5, lines 4-18). Applicant argues Murasawa's interlayer is not an n-type semiconducting film. This is not true because an n-type semiconducting film is a film made of titanium dioxide, which the first layer of Murasawa contains (column 5, lines 1-18). Applicant argues a layer containing an inorganic filler coated with zirconium oxide is not the presently claimed n-type semiconductor film consisting essentially of at least one metal oxide selected from the group consisting of niobium oxide and zirconium oxide. Claim 1 discloses a first n-type semiconductor film as the primer layer consisting essentially of at least one metal oxide selected from the group consisting of niobium oxide and zirconium oxide. Murasawa teaches a first layer provided on a substrate and a second layer with photocatalytic activity layer on the first layer where the first layer comprises titanium dioxide (n-type semiconductor) and is coated with zirconium oxide (column 5, lines 4-18). The primer layer contains zirconium oxide, which meets the claim limitation of claim 1. Applicant argues Murasawa and EP '991 are non-analogous art because Murasawa is directed to an adhesive where EP '991 is directed to two layers that regulate optical characteristics under a photocatalytic film. Examiner respectfully disagrees because Murasawa is directed to a photocatalyst composite (abstract and column 2,lines 6-7). EP '991 and Murasawa are analogous art because they are from the field of photocatalytic articles.

Rejection made under 35 USC 103(a) as being unpatentable over Inoue, et al. EP 0 901 991 A2 in view of Murasawa et al (U.S. 5,547,823) further in view of XP 002151982 and EP 08 20 967 A1 has been withdrawn.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence Ferguson whose telephone number is (703) 305-9978. The examiner can normally be reached on Monday through Friday 8:30 AM – 4:30PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on (703) 308-0449. Please allow the examiner twenty-four hours to return your call.

The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2351.

Lawrence D. Ferguson
Examiner
Art Unit 1774

CYNTHIA H. KELLY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700